

Table 2
Guidelines for Optional Pipe Material Selection

Application	Factors to be Considered	Materials to be Considered	Notes
Mainline Drainage Design Service Life - 75 Years	<ul style="list-style-type: none"> - Service Life - Soil / Water Corrosivity - Fill Height - Bed Load Abrasion - Active Channel Width - Fish Passage 	<ul style="list-style-type: none"> - Corrugated Steel Pipe and Arches (CSP / CSPA) - Structural Steel Plate Pipe and Pipe Arches (SSPP / SSPPA) - Corrugated Aluminum Pipe (CAP) - Reinforced Concrete Pipe (RCP) - Reinforced Concrete Box (RCB) 	<ol style="list-style-type: none"> The materials listed for each application in this table are a preliminary estimate of possible optional materials. Not all of the materials may be feasible in all situations and additional engineering criteria may require evaluation. Some materials may not have adequate hydraulic capacity, service life, corrosion and abrasion resistance, structural capacity, resistance to fire damage, or they may not satisfy environmental requirements or the preferences of local jurisdictions. The use of a specific pipe product may be used if documented properly in the Hydraulic Report in accordance with these guidelines, and the Culvert Service Life Guidelines. To fully document the optional pipe material selection, the following items should be included in the hydraulic report as appropriate. <ol style="list-style-type: none"> An individual hydraulic analysis for each culvert, storm drain, irrigation line or siphon. Additional analysis may be required for pipes with increased roughness values. Results from the corrosive soil and water testing that determine the applicable pipe materials, gages, and coatings that provide an adequate service life for the application. Verification that the minimum and maximum fill height for each optional pipe material and shape is applicable to each crossing. A determination if abrasion protection is required based on the channel bed material and estimated flow velocity. Documentation of any special site or environmental requirements such as fish passage, wildlife access, stream bank width restrictions, or floodplain or overtopping risk. Life-cycle cost analysis The Culvert Service Life Guidelines located in Chapter 9; Appendix E of the adopted AASHTO Model Drainage Manual will be utilized to the extent possible and in combination with 23 CFR 635.411 (b) when specifying pipe products on MDT projects. The fill height tables for various pipes are located in Chapter 17 of the Road Design Manual. These tables shall be used to determine the applicability of the various optional pipe materials, shape, gage, and wall thickness. If maintenance practices such as ditch burning are anticipated near exposed pipe, plastic or coated metal pipe should not be used. The life of irrigation or active stream structures is the time it takes for the first perforation to occur. The AISI chart determines total life, and time to first perforation is estimated to be one-half the total life. Therefore, the life determined by use of the AISI chart (or the equations) must be divided by two to determine time to first perforation.
Approach Drainage Design Service Life - 40 Years	<ul style="list-style-type: none"> - Service Life - Soil / Water Corrosivity - Fill Height - Bed Load Abrasion - Active Channel Width - Fish Passage 	<ul style="list-style-type: none"> - Corrugated Steel Pipe and Arches (CSP / CSPA) - Structural Steel Plate Pipe and Pipe Arches (SSPP / SSPPA) - Corrugated Aluminum Pipe (CAP) - Corrugated Polyethylene Pipe (HDPE) - Reinforced Concrete Pipe (RCP) - Reinforced Concrete Box (RCB) 	
Pipe Extensions Remaining Service Life - 20 Years	<ul style="list-style-type: none"> - Review Remaining Pipe Service Life 	<ul style="list-style-type: none"> - Match Existing Material 	
Inverted Siphons and Irrigation Facilities See Note 7.	<ul style="list-style-type: none"> - Service Life - Soil / Water Corrosivity - Water Tight Joints - Fill Height - Bed Load Abrasion - Channel Width - Maintenance Practices 	<ul style="list-style-type: none"> - Irrigation Class Reinforced Concrete Pipe (RCP) - Reinforced Concrete Box (RCB) 	
Active Stream Crossings and Large Irrigation Canals See Note 7.	<ul style="list-style-type: none"> - Service Life - Soil / Water Corrosivity - Water Tight Joints - Fill Height - Bed Load Abrasion - Channel Width 	<ul style="list-style-type: none"> - Corrugated Steel Pipe and Arches (CSP / CSPA) - Structural Steel Plate Pipe and Pipe Arches (SSPP / SSPPA) - Reinforced Concrete Pipe (RCP) - Reinforced Concrete Box (RCB) 	
Stormdrain Trunkline and Laterals Design Service Life - 75 Years	<ul style="list-style-type: none"> - Service Life - Soil / Water Corrosivity - Water Tight Joints - Hydraulic Capacity - Abrasion - Maintenance Responsibility (Owner Preference) - ADT - Surfacing Type 	<ul style="list-style-type: none"> - Irrigation Class Reinforced Concrete Pipe (RCP) - Reinforced Concrete Box (RCB) 	